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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Amlan Datta

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EXAMINER

DEHGHAN, QUEENIE S

ART UNIT

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1791

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/648,585		DATTA ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	QUEENIE DEHGHAN		1791	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 December 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____.                                     |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/9/09</u> .   | 6) <input type="checkbox"/> Other: _____.                         |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 23, 2009 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 recites the limitation "the blowing agent" in line 3. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1, 2, 5, 8, 9, 11-15, 17-20, 23, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews et al. (3,838,998) in view of Toussaint et al. (4,751,203).

3. Regarding claims 1, 13-14, and 25, Matthews et al. disclose a process for forming microspheres comprising providing an agglomerate precursor including an agglomeration of an aluminosilicate glass (col. 4 line 37) and a binding agent, sodium silicate (col. 5 lines 60-63), so that the components are bound to one another.

Matthews also discloses the firing of the precursor to a temperature (col. 10 lines 23-24) sufficient to form a microsphere having a spherical wall (col. 10 lines 3-6, 44-46) and an average particle diameter greater than 30 microns (note the range 50 microns to 2000 microns produces an average greater than 30 microns in col. 15 lines 14-16).

Furthermore, Matthews et al. disclose drying the precursor mixture (col. 7 lines 49-53) to a first moisture level (col. 8 lines 26-28), such that the agglomerate precursor is substantially dry. See also col. 2 lines 22-33.

4. However, the agglomerate precursor of Matthews does not have an alkali metal oxide content of less than about 10 wt% based on the weight of the precursor.

Toussaint teaches a method for manufacturing microspheres comprising of a glass

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forming composition that contains less than 10% by weight of alkali metals oxides (col.

7 lines 6-8). Toussaint acknowledges traditional production of microspheres have employed glass former compositions with high alkali metal oxide content in order to promote low melting and vitrification temperatures for making the microspheres.

However, such high levels of alkali metal oxides leaves the microspheres prone to attack by hydrolysis, resulting in a weak adherence between the microspheres and the plastic material in which the microspheres are a filler (col. 1 lines 43-60). Toussaint teaches making aluminosilicate microspheres with a glass former composition including an alkali metal oxide content of less than 10% can be successful and is necessary so as to provide for microspheres with high mechanical strength that is resistant to hydrolysis attack (col. 2 lines 34-56, col. 4 lines 45-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized a glass former composition in the agglomerate precursor of Matthews that has an alkali metal oxide content of less than 10% so as to provide for microspheres that have good resistance to hydrolysis when the beads are utilized as fillers in plastic materials.

5. Regarding claims 2 and 17, Matthews et al. disclose firing the precursor to a temperature between 2200-2800°F (1204-1538°C) in col. 10, line 24.

6. Regarding claim 5, Matthews et al. disclose performing the firing step in a heated vertical pipe (col. 9 lines 46-47).

7. Regarding claims 8 and 15, Matthews et al. disclose a blowing agent used in the precursor material (col. 5 lines 65-68 to col. 6 lines 1-2) that is activated during the firing step so as to release a blowing gas to expand the precursor and forming an enclosed

void in the precursor (col. 5 lines 54-57, col. 10 lines 37-45), hence forming microspheres.

8. Regarding claim 9, Matthews et al. disclose heating the precursor to glassify the precursor (col. 10 lines 3-6) to form a molten skin around the precursor (col. 10 lines 37-45).

9. Regarding claim 11, Matthews et al. disclose activating the blowing agent after the formation of the molten skin (col. 12 lines 51-56).

10. Regarding claim 12, Matthews et al. disclose trapping the blowing gas inside the molten skin (col. 5 lines 52-53).

11. Regarding claim 18, Matthews et al. disclose rapidly cooling the microspheres after the firing step (col. 11 lines 39-40).

12. Regarding claim 19, Matthew et al. disclose using blowing gas such as CO<sub>2</sub> and H<sub>2</sub>O (col. 6 lines 9-11).

13. Regarding claim 20, Matthews et al. disclose drying the precursor to a moisture level of less than about 14% (note the range 5 to 15% is less than about 14% in col. 8 lines 13-14).

14. Regarding claim 23, Matthews et al. disclose a drying step to reduce moisture of the precursor (col. 7 lines 49-53) and expansion of the precursor can be attributed to the steam in the feed particle (col. 16 lines 10-11). Matthews et al. also mention that rupturing of the precursor will occur if expansion is too fast or too much (col. 12 lines 63-65). Because water is a major contributor to the expansion of the precursor, too much water would result in excess rupturing. Since Matthews et al. perform a drying step to

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the precursor to reduce the moisture content; having less water in the precursor would inherently reduce the rupturing of the precursor.

15. Regarding claim 26, Matthews discloses a water content of 6% (col. 8 lines 26-28).

16. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews et al. (3,838,998) in view of Toussaint et al. (4,751,203), as applied to claim 1 above, in view of Seki et al. (JP Abstract 07024299). Matthews et al. disclose a process for manufacturing microspheres, but do not disclose using a fluidized bed reactor. Seki et al. teach producing microspheres, wherein the firing step is performed in a fluidized bed reactor (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the fluidized bed reactor of the Seki et al. in the process of Matthews et al. and Toussaint et al. in order to supply heat to the precursor.

17. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews et al. (3,838,998) in view of Toussaint et al. (4,751,203), as applied to claim 1 above, in view of Aston et al. (4,475,936). Matthews et al. disclose a process for manufacturing microspheres, but do not disclose using a vortex furnace that is fuel fired. Aston et al. teach a vortex furnace (abstract) that is fuel-fired (col. 1 line 52) and is used to fire up glass particulates into spherical shapes (col. 1 lines 13-18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the fuel-fired vortex furnace of Aston et al. in the process of Matthews et al. and Toussaint et al. to supply rapid heating of the glass particles.

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18. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews et al. (3,838,998) in view of Toussaint et al. (4,751,203), as applied to claims 2 and 9 above, in view of Veatch et al. (2,978,340). Matthews et al. disclose a process for manufacturing microspheres, but do not disclose a firing period of 0.05 to 20 seconds and activating the blowing agent during the formation of the molten skin. Regarding claim 7, Veatch et al. teach making microspheres by firing the precursor for 2 seconds (col. 4 lines 60-61). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the firing period of Veatch et al. in the process of Matthews et al. and Toussaint et al. to ensure enough time to adequately fuse and expand the particles, as taught by Veatch et al. Regarding claim 10, Veatch et al. teach of activating the blowing agent during the formation of the molten skin (col. 1 lines 33-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the activation step of Veatch et al. in the process of Matthews et al. and Toussaint et al. in order to allow for the expansion of the microsphere.

19. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews et al. (3,838,998) in view of Toussaint et al. (4,751,203), as applied to claim 13 or 15 above, in view of Kizilshtein et al. (English translation of SU 1650196 abstract) and Yamada et al. (2001/0043996) and Brown et al. (4,235,753). Matthews et al. disclose a process for manufacturing microspheres, but do not disclose sources for the aluminosilicate, binding agent and blowing agent. Kizilshtein et al. teach of aluminosilicate microspheres made from fly ash (abstract). Yamada et al. teach using



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silicon carbide as a blowing agent ([0052]). Brown et al. teach using sodium hydroxide with aluminosilicate to form zeolites (col. 5 lines 48-60). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the aluminosilicate from fly ash, silicon carbide as a blowing agent, and a hydroxide binding agent as taught by the reference above in Matthews et al. and Toussaint et al. process in order to utilize the availability of the fly ash resources, to generate the gas needed to expand the microsphere, as taught by Yamada et al., and to have a thermally stable binder and allow for access of the gases, as taught by Brown et al. (col. 1 lines 28-31).

20. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews et al. (3,838,998) in view of Toussaint et al. (4,751,203), as applied to claim 13 above, in view of Netting (3,888,957). Matthews et al. disclose a process for manufacturing microspheres, but do not disclose a drying temperature of 50°C. Netting teach of two drying steps where hollow spheres are dried at a temperature of about 50°C and then further dried at a raised temperature about 400°C (col. 5 lines 30-31). Netting teach an example where the particle was dried at 100°C and then 300°C, which is interpreted to be about the claimed temperatures, according to specification disclose by the applicant on page 21, [0087]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the drying temperatures of Netting in the process of Matthews et al. and Toussaint et al. in order to remove the proper amount of moisture, as taught by Netting.

21. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matthews et al. (3,838,998) in view Veatch (2,978,340) and of Toussaint et al. (4,751,203). Matthews et al. disclose a method for forming microspheres comprising:

- a. Providing an agglomerate precursor comprising an aluminosilicate component, which naturally would have a preselected size (col. 4 line 37), a blowing agent, and a binding agent (col. 5 lines 60-68), with water to form a homogenous mixture (col. 7 lines 29-44); and
- b. Drying the mixture to form agglomerate precursor comprising bound particles (col. 7 lines 49-53); and
- c. Firing the precursor at a temperature greater than 800°C (col. 10 line 24) and time to activate the blowing agent to release gas, thereby forming microspheres with an internal void (col. 10 lines 37-45).

Matthews et al. further disclose the firing time as very short (col. 1 lines 4-6), but does not disclose a specific amount of time. Veatch et al. teach a firing time of less than 20 seconds (col. 4 lines 40-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the firing time of Veatch et al. in the process Matthews et al. in order to adequately fuse the and expand the hollow spheres.

Furthermore, Matthews et al. fail to disclose an alkali metal oxide content of the microspheres to be less than about 10 wt.%. Toussaint teaches a method for manufacturing microspheres comprising of a glass forming composition that contains less than 10% by weight of alkali metals oxides (col. 7 lines 6-8). Toussaint acknowledges traditional production of microspheres have employed glass former

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compositions with high alkali metal oxide content in order to promote low melting and vitrification temperatures for making the microspheres. However, such high levels of alkali metal oxides leaves the microspheres prone to attack by hydrolysis, resulting in a weak adherence between the microspheres and the plastic material in which the microspheres are a filler (col. 1 lines 43-60). Toussaint teaches making aluminosilicate microspheres with an alkali metal oxide content of less than 10% can be successful and is necessary so as to provide for microspheres with high mechanical strength that is resistant to hydrolysis attack (col. 2 lines 34-56, col. 4 lines 45-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized a glass former composition in the agglomerate precursor of Matthews that has an alkali metal oxide content of less than 10% so as to provide for microspheres that have good resistance to hydrolysis when the beads are utilized as fillers in plastic materials.

### ***Response to Arguments***

4. Applicant's arguments, filed December 23, 2009, with respect to the combination of Matthews and Matsubara have been fully considered and are persuasive. The previous rejections in the office action dated June 8, 2009 have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Toussaint.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Queenie Dehghan whose telephone number is

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(571)272-8209. The examiner can normally be reached on Monday through Friday  
8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Queenie Dehghan/

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